

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/340564691>

Frequencies 171.160 Hz, 174.989 Hz, and 1185.131 Hz useful in combating COVID-19 (Novel Coronavirus)

Preprint · April 2020

DOI: 10.31219/osf.io/pagmf

CITATIONS

0

READS

4,359

1 author:



[Abir Chakravorty](#)

Indian Institute of Technology Kharagpur

13 PUBLICATIONS **12** CITATIONS

SEE PROFILE

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

**Frequencies 171.160 Hz, 174.989 Hz, and 1185.131 Hz useful in combating COVID-19
(Novel Coronavirus)
Abir Chakravorty^{1*}**

¹PhD research scholar, Department of Mechanical Engineering, Indian Institute of Technology
Kharagpur, Kharagpur-721302, India.

*Email: abir.cty2015@gmail.com, abirchemengg@iitkgp.ac.in

Abstract

The paper presents the works carried out by different researchers for identifying the SARS-CoV-2 virus structure, and its background with the present medication being addressed to the COVID-19 patients. The paper discusses three candidates for possible defense and cure of humans against the virus along with the regular medication. The first is the resonant frequency therapy, which has proven its efficacy for treating different types of viral infection and cancer cells as the capsid of Rubella measles virus, Satellite Tobacco necrosis Virus, Cancer cells and many more are neutralized on the application of frequency equal to the resonance frequency of the protein shell of the virus. It is expected that there must be a resonance frequency corresponding to the capsid of the SARS-CoV-2, on the application of which might result in the disintegration of the protein shell. As treating a huge number of people in hospitals is becoming increasingly difficult and large number of population is under quarantine, a resonance audio frequency of this sort embedded in a soothing music can be melodius, and the same if played in public spaces and homes might help a great deal. The frequencies (approximate values) are 171.160 Hz, 174.989 Hz, 1185.131 Hz the complete details regarding administration and calculation of the frequencies are discussed in this manuscript. This treatment along with the presently administered treatment to COVID-19 patients might aid in their quick recovery from illness. Further the audio frequency/ resonance frequency therapy, and the strategy discussed in this manuscript might be useful in future from any kind of Virus attacks/ Biological warfares either intentionally or naturally. Also, the medicinal properties of ethnomedical plants such as Piper nigrum, and Ocimum tenuiflorum L and essential oils such as Eucalyptus oil are discussed. The last one being the antiviral activities of copper in the form of copper oxide nanoparticles in medicine which has proven its efficacy for viral prevention, replication, and RNA degradation are also discussed.

1. Introduction

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

The outbreak of the novel coronavirus disease (COVID-19), caused by the SARS-CoV-2 virus, that is officially designated by World Health Organization as severe acute respiratory syndrome-related coronavirus, represents a pandemic threat to global public health[1]. Within the span of two and a half to three months, the disease has quickly spread from Wuhan its epicenter in China to all over the world with the number of affected people 276,665 and the number of deaths constantly rising to 11419 as on 21-March-2020. Italy now being the worst hit after China, registered with more than 4400 people deaths. In India the virus has already caused casualty to four people, one being 76-year-old man, from the southern state of Karnataka, a 68-year-old woman from Delhi, a 64-year-old man from Maharashtra, and a 72-year old man from Punjab, rendering more than 270 people infected. Researchers worldwide are racing to develop potential vaccines and drugs to fight the new coronavirus, called SARS-Cov-2.

CoVs are positive-stranded RNA viruses with a crown-like appearance under an electron microscope (*coronam* is the Latin term for crown) due to the presence of spike glycoproteins on the envelope. The subfamily *Orthocoronavirinae* of the *Coronaviridae* family (order *Nidovirales*) classifies into four genera of CoVs: Alphacoronavirus (alphaCoV), Betacoronavirus (betaCoV), Deltacoronavirus (deltaCoV), and Gammacoronavirus (gammaCoV). Furthermore, the betaCoV genus divides into five sub-genera [2]. Genomic characterization has shown that probably bats and rodents are the gene sources of alphaCoVs and betaCoVs. On the contrary, avian species seem to represent the gene sources of deltaCoVs and gammaCoVs[2].

The SARS-CoV-2 belongs to the betaCoVs category. It has round or elliptic and often pleomorphic form, and a diameter of approximately 60–140 nm. Like other CoVs, it is sensitive to ultraviolet rays and heat. Furthermore, these viruses can be effectively inactivated by lipid solvents including ether (75%), ethanol, chlorine-containing disinfectant, peroxyacetic acid and chloroform except for chlorhexidine. According to Chen et al.[3] the genome of the new HCoV, isolated from a cluster-patient with atypical pneumonia after visiting Wuhan, had 89%

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

nucleotide identity with bat SARS-like-CoVZXC21 and 82% with that of human SARS-CoV[4]. For this reason, the new virus was called SARS-CoV-2. Its single-stranded RNA genome contains 29891 nucleotides, encoding for 9860 amino acids. Although its origins are not entirely understood, these genomic analyses suggest that SARS-CoV-2 probably evolved from a strain found in bats.

The 2019 novel coronavirus primarily infects the cells of the respiratory system, the covering cells of sacs in the lungs of humans. Angiotensin-converting enzyme 2 (ACE2) is the cellular receptor for SARS coronavirus [5]. Researchers from the University of Texas at Austin developed a 3.5-angstrom-resolution cryo-electron microscopy structure of the 2019-nCoV S trimer in the prefusion conformation [6]. The novel coronavirus uses many different proteins to replicate and invade cells, the spike protein is the major surface protein that it uses to bind to a receptor and acts as a doorway into a human cell. After the spike protein binds to the human cell receptor, the viral membrane fuses with the human cell membrane, allowing the genome of the virus to enter human cells and begin infection. Therefore entry prevention can be achieved by preventing attachment and fusion. Figure 1 shows a transmission electron microscope image of SARS-CoV-2 virus and an anatomy schematic of the same, represents the SARS-CoV-2 DNA code.

Researchers from the University of Chicago, Argonne National Laboratory, Northwestern University Feinberg School of Medicine and the University of California, and others carried out the mapping. They stated that the Nsp15 protein from SARS-CoV-2 is 89% similar to the SARS-CoV protein. Previous SARS studies published in 2010 show that Nsp15 inhibition can slow viral replication, offering hope for the use of Nsp15-targeting drugs to treat Covid-19. Mapping of a 3D protein structure allows better insights into the virus's replication in human cells.

In this connection, there is a rapid attempt for the development of vaccines worldwide. Vaccines are dead or weakened antigens that train the immune system to create antibodies before the body

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

is exposed to the disease causing virus. When foreign bacteria or viruses enter the body, immune cells such as lymphocytes respond by producing antibodies, which are protein molecules. These antibodies fight the foreign disease causing invader known as an antigen and protect us against further infection. According to the Centers for Disease Control and Prevention (CDC), a healthy individual can produce millions of antibodies a day, fighting infection so efficiently that people never even know they were exposed to an antigen. Unfortunately, the first time the body faces a particular invader, it can take several days to ramp up this antibody response. For this antigen like the measles virus or whooping cough bacteria, a few days is too long. The infection can spread and kill the person before the immune system can fight back. The incubation period for the novel coronavirus is about 2 to 14 days, an average of 5 days after exposure.

1.1 Diagnosis

The characteristic proper diagnosis of COVID-19 infection is the first line of control and a deciding factor in the initiation of the course of treatment. The distinction of COVID-19 from general cold infections is essential for proper treatment. The symptoms vary in patients and preliminary examination may not provide a clear diagnosis of COVID-19 infection. The doctors generally take into consideration, the travel history of the patient along with other symptoms of cough, sneezing, fever, etc. On initial inference, the sputum examination and other diagnostic tests help in the proper establishment of early infection. The number of days from a possible first day of infection is taken into account for recommending the respective diagnostic tests:

RT-PCR -The standard method of diagnosis is by reverse transcription-polymerase chain reaction (RT-PCR) from a nasopharyngeal swab or sputum sample, with results within a few hours to 2 days.[7]

ELISA -Antibody assays can also be used, using a blood serum sample, with results within a few days.[8]

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

CT-Scan - The infection can also be diagnosed from a combination of symptoms, risk factors, and a chest CT scan showing features of pneumonia. The diagnosis reports from hospitals in China indicate that most of the COVID-19 infected patients were diagnosed with pneumonia and characteristic CT imaging patterns [5, 9].

1.2 Preventive Measures

In the absence of availability of emergency medicine or complete therapy for COVID-19; the prevention of the spread of SARS-CoV-2 virus and regulation of infection is the prime step in controlling this epidemic disease. The containment of the infected patients has been recommended as one step to control the rampant transmission among people. The standard procedures that are recommended for prevention of any infection spread would be more effective in controlling the spread and keeping one safe.

The most important preventive measures are

(a) Regular hand washing, a simple practice but effective. Washing of hands after visits to public places would help keep the virus (even if exposed to contaminated surfaces) away from getting transmitted.

(b) Other practices include covering the mouth and nose when coughing and sneezing to prevent the spread particularly if the person is asymptomatic or in initial stages of infection.

(c) Also, thoroughly cooking meat, eggs, and food from animals would destroy the virus. In general practice, one should avoid close contact with anyone showing symptoms of respiratory illness such as coughing and sneezing.

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

(d) This frequent touching of mouth and face parts pose a higher possibility of reaching the virus to a person's respiratory system on the exposure of hands with contaminated surfaces (in shops, malls, buses, and other public places) or handshake with symptomatic persons.

(e) Avoiding close contact with anyone showing symptoms of respiratory illness such as coughing and sneezing.

1.3 The treatment being administered to COVID-19 patients

Since SARS-CoV-2 is a newly discovered pathogen, no specific drugs have been identified or are currently available. The strategy ongoing is to repurpose existing drugs [5, 9]. On the basis of genomic sequence information coupled with protein structure modeling, the scientific community has been able to rapidly respond with a suggested list of existing drugs with therapeutic potential for COVID-19. The treatment is symptomatic, and oxygen therapy/ventilation represents the major treatment intervention for patients with severe infection. Mechanical ventilation may be necessary in cases of respiratory failure whereas hemodynamic support is essential for managing septic shock. Table 1 provides a summary of drugs together with potential mechanisms of actions for their activities.

Table 1: Some drugs having therapeutic potential (Drug repurposing) being administered for COVID-19

Drug	Disease indication	Possible action on COVID-19
Remdesivir [10]	Ebola virus infection	Nucleotide analog that may block viral nucleotide synthesis to stop viral replication
Favipiravir [11]	Viral infections	Purine nucleoside that acts as an

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

		alternate substrate leading to inaccurate viral RNA synthesis
Arbidol [12]	Influenza antiviral drug ACE2d	An inhibitor that damages the binding of viral envelope influenza antiviral drug ACE2d protein to host cells and prevent viral entry to the target cell
Ritonavir [13]	Approved drug for HIV infection	-----
Chloroquine [12]	The drug that can elevate endosomal pH and interfere with ACE2 glycosylation	Parasite infection (malaria)
Baricitinib [14]	Drug for rheumatoid arthritis	JAK inhibitor which might interfere with the inflammatory processes

Empirical antibiotics were prescribed for 90% of patients in three reports[15], [16], [17], [18]. According to these reports, more than 85% of patients received antiviral agents, including oseltamivir (75 mg every 12h orally), ganciclovir (0.25 g every 12h intravenously) and lopinavir/ritonavir tablets (400/100 mg twice daily orally). Table 2 represents the treatment and outcomes of 278 patients in Wuhan, China.

Table 2: Treatment and result of patients of Wuhan, China infected with SARS_CoV-2 pneumonia [15-18]

	Wang et al.(n=138)	Chen et al.(n=99)	Huang et al. (n=41)
Treatment			

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

Antiviral treatment	124	75	38
Antibiotic treatment	138	10	41
Antifungal treatment	NA	15	NA
Corticosteroid treatment	62	19	9
CRRT	2	9	3
IVIg therapy	NA	27	NA
Invasive mechanical ventilation	17	4	2
ECMO	4	3	2
Complications			
ARDS	27	17	12
Acute kidney injury	5	3	3
Acute cardiac injury	10	NA	5
Secondary infection	NA	5	4
Shock	12	4	3
ICU unit admission	36	23	13
Mortality	6	11	6

ARDS: acute respiratory distress syndrome; ECMO: extracorporeal membrane oxygenation; CRRT: continuous renal replacement therapy; IVIg: intravenous immunoglobulin; NA: not available; ICU: intensive care unit.

2. Possible potential treatment option for the patient along with regular medication

Three strong candidates for possible defense and cure against the SARS-CoV-2 virus along with the regular medication being addressed to the patients have been identified and discussed in this paper. The first one being the resonant frequency therapy, which has proven its efficacy for treating different types of viral infection and cancer cells. Another method includes the medicinal

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

properties of ethnomedical plants such as *Piper nigrum* and *Ocimum tenuiflorum* L to be administered in a way as discussed in this manuscript. The third one being the antiviral activities of copper in the form of Cu^{2+} ions and copper oxide nanoparticles in medicine which has proven its efficacy for viral Prevention, Replication, RNA Degradation.

2.1 Resonance frequency therapy (RFT) - Killing viruses by mechanical resonance in their DNA strand or receptor binding site of SARS-CoV-2 virus by mechanically damaging the sites and thus rendering them ineffective to plug with healthy human cells.

According to Dykeman et al. [19], all objects have *resonant frequencies* at which they naturally oscillate. *Viruses are susceptible to the same kind of mechanical excitation and after a certain threshold value, the virus membrane is compromised due to increased mechanical resonances, leading to the debilitation and destruction of specific genomic materials with which the resonance frequency matches.*

The calculations of the therapeutic frequencies of novel Coronavirus is based on the method of researcher Boehm [20] (US Patent no. 7,280,874 B2 dated Oct. 9, 2007). The author reported success of in-vitro and in-vivo tests of diseases in humans with her method. According to author claims, she was successful in treating *Borrelia burgdorferi* virus which leads to lyme disease, Rubella Measles virus, *Escherichia coli* and others. The therapeutic frequency determined by author's technique was successful in treating some people.

On the guidelines of the above method, certain audio frequencies are proposed, based on the size and molecular weight of Receptor Binding Domain of the SARS-CoV-2 (novel Coronavirus) which actively binds with human ACE2 receptor, if the receptor binding domain of the above stated virus can be modified/damaged with use of resonance pulsation through audio frequency then the virus will be rendered useless. Please note according to literatures this audio frequency will target only the specific receptor/ spike protein of the novel Coronavirus without harming healthy cells. The frequency which is in audio range was

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

calculated to be **174.989 Hz** (approx.). Alternatively based on the length of the RNA of the SARS-CoV-2 (novel Coronavirus) virus which is 30 kb [46]. The therapeutic resonant frequency was calculated to be **171.160 Hz** (approx.).

Another method is calculation of therapeutic resonant frequency for the spike protein of the novel Coronavirus based on the number of bases present in its genome, and on the guidelines of the US patent 7,280,874 B2 the therapeutic resonant frequency was calculated to be **1185.1313 Hz (approx.)**.

The best way to administer the frequency is in the form of any audio speaker preferably concave such that the focus of the speaker targets vicinity of the lungs of the patients such that the speakers are placed near the beds of the patients.

Regarding the time of treatment discussed in US patent 7,280,874 B2 [20], it is stated that a student experiencing symptoms of both lyme disease and ehrlichiosis, who was unable to attend school for a year and half due to the severity of symptoms. The student used previously unavailable therapeutic resonant frequencies as determined by methods of the invention discussed in the above stated patent. Within two weeks of beginning therapy the student was well enough to return to school.

Please note:- The efficacy of the above stated frequencies needs to be verified. A resonance audio frequency of this sort, if placed in public spaces such as hospitals, quarantine facilitated places and homes might help a great deal by debilitating the proliferation of the virus. At least, they will definitely relieve some of the stress of the patients, hospital staffs and people.

For the experimentation purpose, Boehm [20] selected the DNA genome of *Borrelia burgdorferi* strain B31 containing 910,724 base pairs and calculated the total length of the genome. The length of the genomic material was found by the number of base pairs and multiplying with the spacing between the adjacent base pairs of the genome of the microorganism. The inventor

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

validated her findings with the experiments on different types of genomes, Rubella measles (RNA) virus was also one of them. Using a similar approach as taken by the author stated above for determining the therapeutic resonant frequency of the genome of *Borrelia burgdorferi* strain B31 virus, figure 4 being cured by Boehm [20] Resonant Frequency Therapy technique.

In the present approach as stated in this paper, it is focused on **the RBD (receptor-binding domains) of the SARS-CoV-2 virus which is of the order of 21 kDa**[6]. Using the data provided by Zetasizer Nano ZS and ZSP models [21] the size corresponding to the molecular weight of 20 kDa is approximate $4.3 \times 10^{-9} m$. According to Boehm [20], the length of an object can represent the object's Wavelength;.

2.1.1. Calculation of frequency 174.989 Hz for RBD (receptor-binding domain) of the SARS-CoV-2 virus

For in vitro experiments, The RBD under consideration is present in air medium, velocity would be the speed of electromagnetic radiation, or light, in air. To determine the therapeutic resonant frequency, the velocity of electromagnetic radiation through air (299,792,458 m/ s) divided by the wavelength, which in this case is $4.3 \times 10^{-9} m$.

$$\frac{\text{velocity}}{\text{wavelength}} = \text{frequency}$$

Dividing this velocity by the SARS-CoV-2, RBD wavelength we get 6.972×10^{16} Hz which is the first therapeutic resonant frequency of RBD in air. But the derived frequency is extremely high for in vitro conditions and the genomic material will exist in living tissue **in vivo** conditions. Therefore the next attempt will be to determine the **in vivo** therapeutic frequency of RBD domain of SARS-CoV-2 virus in humans.

For in-vivo conditions, the virus-cell will be present inside the living organism therefore, the medium will be the living tissue and not air. As a result, for the mentioned purpose suitable

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

corrections have to be calculated. The velocity of electromagnetic radiation through a general in-vivo tissue medium is equal to the inverse of the square root of the product of the electrical permittivity and the magnetic permeability of the medium. The formula for the velocity of electromagnetic radiation through a typical in vivo tissue medium is given by the following

$$velocity = \frac{1}{\sqrt{\text{electrical permittivity} \times \text{magnetic permeability}}}$$

The magnetic permeability (μ) through in-vivo tissue is known to be the same as that in air: $1.2566370614 \times 10^{-6} m$ henrys/meter. The representative value for the electrical permittivity in live tissue is taken to be $71 \times 10^{-12} m$ farads/meter. The velocity of electromagnetic radiation through a typical in-vivo tissue will be $105898549.2 m/s$. Therefore, the first therapeutic resonant frequency in this case will be $= \frac{105898549.2}{4.3 \times 10^{-9}} Hz = 2.463 \times 10^{16} Hz$.

A general refractive index, n of electromagnetic radiation through in-vivo tissue is determined

using the formula
$$n = (\text{speed of light in vacuum} / \text{speed of light in the medium})$$
$$= 299792458 ms^{-1} / 105898549.2 ms^{-1} = 2.831$$

According to Boehm [13] to determine an accurate resonant frequency in the audio range corresponding to first therapeutic resonant frequency, the first resonant frequency is divided by the number 2, as many times as necessary, to reach a frequency in the audio range. In musical terms, frequencies that are related by a factor of 2 are known as octaves.

The first therapeutic resonant frequency is divided by 2^{47} , which leads to the corresponding therapeutic resonant frequency of **174.989 Hz (approx.)** in the audible range, capable of generation from any typical frequency emitting devices. **This frequency if embedded in a soothing music can be melodius, and the same if played in public spaces and homes might help a great deal.** This in-vivo therapeutic resonance frequency is for the receptor-binding domain of the SARS-CoV-2 virus, this frequency can be shifted by octaves to a higher or lower frequency by multiplying or dividing by 2 can possibly cause destruction of RBD sites of SARS-

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

CoV-2 virus. The frequency as stated needs to be verified for its efficacy in treating COVID-19 patients.

2.1.2. Calculation of the therapeutic resonant frequency 171.160 Hz for the RNA of Novel Coronavirus

According to US Patent 7,280,874 B2 the length of an object can represent the object's wavelength. Therefore the length of the RNA genome to be 30 kb as stated in research manuscript [3]. Therefore the length of the genome will be after applying conversion from kb to metres 9×10^{-6} m.

The velocity of electromagnetic radiation through a typical in vivo tissue medium is given as follows

$$\begin{aligned} \text{velocity} &= \frac{1}{\sqrt{\text{electrical permittivity} \times \text{magnetic permeability}}} \\ &= \frac{1}{\sqrt{1.2566370614 \times 10^{-6} \times 71 \times 10^{-12}}} \\ &= 1.0586 \times 10^8 \text{ m / s} \end{aligned}$$

Therefore, the in-vivo therapeutic resonant frequency will be as follows,

$$\begin{aligned} \frac{\text{velocity}}{\text{wavelength}} &= \text{frequency} \\ \text{frequency} &= \frac{1.0586 \times 10^8}{9 \times 10^{-6}} = 1.1762 \times 10^{13} \text{ Hz} \end{aligned}$$

According to US Patent 7,280,874 B2, the first therapeutic resonant frequency is divided by 2^{36} , which leads to the corresponding therapeutic resonant frequency of **171.1596 Hz** (approx.) in the audible range. **This frequency has to be embedded in a soothing music so that it is pleasant and melodius to hear, and the same if played in public spaces and homes with the help of audio devices might help towards the treatment of COVID-19 patients and/ or debilitating the proliferation of the virus.**

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

2.1.3. Calculation of the therapeutic resonant frequency 1185.131 Hz for the spike protein of the Novel Coronavirus

According to Boehm [1] (US Patent 7,280,874 B2) in an alternative embodiment of her methods for determining therapeutic resonant frequencies for genomic material under consideration use the numerical constant 4,526,016.44 as follows:

4,526,016.44 divided by the number of base pairs or bases in a chain=frequency. As such, the method provides an efficient means for determining frequency by ascertaining the number of base pairs or bases in the genomic material, and dividing that number into the aforementioned constant. The number of bases for use in determining resonant frequencies can be ascertained by multiplying the number of amino acids in a protein chain by 3.

Therefore according to Lu et al. [7] the spike protein of Novel Coronavirus contains 1273 amino acids, that means according to the US Patent 7,280,874 B2, the number of bases are $1273 \times 3 = 3819$.

Therefore the therapeutic resonant frequency for the spike protein is =
$$= \frac{4526016.44}{3819} = 1185.1313 \text{ Hz (approx.)}$$

The above stated frequency i.e. 1185.1313 Hz (approx.) if embedded in a soothing music can be melodius, and the same if played in public spaces and homes might help a great deal towards the treatment of COVID-19 patients and/ or debilitating the proliferation of the virus

Regarding the time of application, experiments for treating cancer using resonance frequency therapy were conducted by Dubost et al.[22] where they found a substantial reduction in proliferation and destruction of certain cancer cells such as pancreatic cancer cells to leukemia on the application of Plasma Emission Field Treatment (PEFT) with the modulation frequency at 150 kHz, 310 W and 197 kHz, 250 W for **2 to10 hours** respectively. Also, they reported two

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

perpendicular electric fields/frequency emitting devices are 20% more effective than a single directional field.

According to the calculation way of therapeutic resonant frequency demonstrated by Boehm [20]. It is expected that the RBD of SARS-CoV-2 virus will start resonating and amplitude will start to grow after a particular time of application of this 174.989 Hz of frequency leading to debilitation, destruction/disfiguring of RBD receptor in SARS-CoV-2 virus. The time of application can be anywhere between 2 hours to 10 hours [20,22]. Nevertheless, the frequency needs to be verified for its efficacy in treating COVID-19 patients.

The administration of the SARS-CoV-2 patient with the above stated resonant frequency along with the medications might prove helpful in quick recovery from COVID-19 illness.

Dubost et al.[22] investigated therapeutic effects of resonant frequency and targeted destruction and proliferation mitigation of different kinds of cancer cells including Leukemia using Electromagnetic Field through the gas plasma, generating frequency specially tuned, pulsed, amplitude-modulated radio-frequency fields utilizing an enclosed gas plasma antenna imparting frequency of 100-300 kHz and application to the targeted Leukemia cell for 3-5 minutes resulted in the disintegration of the cells. For the experimentation purpose, Dubost and Holland [22] used the device by Bare [24], and confirmed its ability to be used as a Resonant Frequency Therapy Device. The device uses a specific type of antenna, a hollow glass sphere, the inside air of which is evacuated and replaced by helium gas and the electronic signals are sent via the helium gas. The device generates a pulsed output frequency (on and off). The reason for pulsing the output was that the application of constant electromagnetic frequency will induce heat and result in the indiscriminate killing of all cells. Further, according to them, each virus bacteria has its specific type of resonance frequency which if matched/nearly equal with the input frequency can be used to mechanical rupture/killing due to the higher mechanical resonances induced on the virus/bacteria membranes concerned, without affecting non-harmful cells.

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

The electric field in vivo, inside a living non-magnetic body, the induction magnetic field B_i is unchanged. The near electric field E_i is equal to (4), $\tilde{n} = n - jk$, being the living body complex index of refraction[22]

$$E_i = \frac{E}{|\tilde{n}|^2}, \quad |\tilde{n}|^2 = n^2 + k^2 = \sqrt{\epsilon_r^2 + \frac{\sigma^2}{\omega^2 \epsilon_o}}$$

According to Dubost et al. [3] Microtubules play a fundamental role throughout the whole life of eukaryotic cells, the fundamental static mechanical vibration frequency (f_r) of a particular microtubule is equal to

$$f_r = \frac{3.56}{L^2} \sqrt{\frac{E_L I}{\rho S}}, \quad E_s = F_s / Q, \quad F_s = \frac{2Q^2}{\pi \epsilon_o \epsilon_r L^2},$$

$$f_r = 9.5 \times 10^{-10} \sqrt{E_L} / L^2$$

where F_s opposed longitudinal static forces, L is the microtubule length and Q is the static positive and negative electric charges located at its two ends with $Q = 7.5 \times 10^{-17}$ Coulombs and S is the static pressure applied on the microtubule section. E_L is the Young's modulus and $\sqrt{I/S}$ is microtubule rod gyration radius. For a hollow rod it was taken to be $0.35D$, where D is the diameter of the microtubule. The density was taken to be 1000 Kg/m^3 .

The mitotic spindle cleavage of human cancer cells, exposed to PEFT (Plasma Emission Field Treatment) was evident with morphological transformations of human cancer cells (represented in Table 3), exposed to PEFT, to the fundamental mechanical resonance frequencies f_r of the microtubules. Dubost and Holland [22] found that human leukemia, pancreatic cancer cell, ovarian cancer cell being shattered when their PEFT frequency matched with the respective microtubules resonance frequency.

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

Table 3: Cell microtubule lengths L (micrometers) and their corresponding fundamental mechanical resonance frequencies, f_r in vivo (Inside living organism) and in vitro (controlled experimental set up conditions)[22]

f_r (kHz)	L (μ m), length of the microtubule	
	in vivo 37 °C $E_L = 2 \times 10^7$ Pa	in vitro 20 °C $E_L = 6 \times 10^7$ Pa
100	6.5	8.6
120	5.9	7.8
140	5.5	7.2
160	5.1	6.8
180	4.8	6.4
200	4.6	6.1

Dykeman and Sankey[19] have found a method to calculate the resonant frequencies. They suggested the method for the calculation of the low-frequency vibrational modes and frequencies of viral capsids, or other large molecules, where the modes are modeled with atomic detail. Extending ideas from electronic structure theory, they calculated energy functional to be used to find modes of a classical dynamic matrix below a fixed pseudo-Fermi level. Determination of the structure of protein for icosahedral satellite tobacco necrosis virus and finding its resonant frequency was conducted by them.

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

The authors carried out the minimization of effective band-structure energy, G using a functional of Ordejón-Drabold-MartinGrumbach (ODMG) [23,25], $G = \min \{Tr_M [H + (1 - S)H]\}$. The Hamiltonian H and overlap S are square matrices of order M [19]. Dykeman and Sankey demonstrated the minimization of electronic structure-based energy functional thereby providing a method for determining the low-frequency vibrational modes of very large systems, such as viruses, atomistically.

2.2 Value of Ethnomedical plants and essential oils derived from them in treatment of respiratory tract infection

(a) Ethnomedical plants

The value of ethnomedical plants can be extended to the medicinal effects in treating Asthma, where according to author Debatri Banerjee [26]. Roots or leaves of the plant *Ocimum tenuiflorum* L. (Tulsi) mixed with equal quantity of Basak [Scientific name: *Adhatodavasica* Nees.], (1/4)th quantity of Black Pepper, (*Piper nigrum* L.), 1/3rd quantity of dried Ginger (*Zingiber officinale* Rosc.), 1/4th quantity honey together is crushed and mixed with 100 gm of ghee. The whole mixture is tossed in a pan in medium flame for few minutes. The mixture is cooled and preserved in a can. One teaspoon is given twice daily to treat asthma until cure. If this formulation causes adverse reactions in the person then the quantity of dose reduced to half.

(b) Essential oils

There is a comprehensive data on **human trials** demonstrating the beneficial effects of 1,8-cineole in various respiratory conditions in the Handbook of Essential Oils edited by Can Baser and Buchbauer reported in the review paper on Essential oils in the treatment of respiratory tract diseases by Horvath and Kamilla [27]. As discussed in the paper 1,8-cineole or eucalyptus EO (Essential oil) can be effectively applied in the treatment of asthma, acute or chronic bronchitis, COPD, common cold, and sinusitis. However, it is necessary to mention that EOs with a high content of menthol or 1,8-cineole should not be applied to the faces of infants or children.

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

EOs are beneficial natural products and they possess valuable biological properties. An essential oil may contain hundreds of individual chemical components, mainly mono- and sesquiterpenoids, and phenylpropanoids. For therapeutic purposes, they are administered via inhalation (e.g. eucalyptus oil), orally (e.g. peppermint oil) and trans-dermal (e.g. rosemary oil) [27,28]. Oils with a high phenol content, such as thyme and clove, have antiseptic properties. Because of their wide-ranging and complex effects, e.g. antibacterial, antiviral, anti-inflammatory, mucolytic, a bronchodilator and many more. Also, they can be used as valuable materials in the treatment of different respiratory tract diseases. Aromatherapy patch application another possible solution for treating/ preventing respiratory infections. In this case, the use of a special carrier is also important which keeps the aromatic substances in fresh and constant form, and limits their release before the application [29]. According to the researchers[28], there is a probability that respiratory tract pathogens will be inactivated when getting into contact with the inhaled vapor, hence the saturated patch is usually placed in the vicinity of the nasal pathway with the application of an appropriate mask also. In a patent by Hymes et al. [29], the adhesive patch contains safe and effective amounts of EOs (e.g. wintergreen, cinnamon, ginger, peppermint, lemon, clove, clary sage, and chamomile) alone or in combination, which is unique with adhesive and a viscoelastic nature, the combination of the EO could continuously make contact with the skin of the patient [29].

2.3 Antiviral Activities of Cu²⁺ Ions in Viral Prevention, Replication, RNA Degradation, and for Antiviral Efficacies

Copper compounds show a vast array of biological actions, including anti-inflammatory, anti-proliferative, biocidal and others. It also offers a selection of radioisotopes, suitable for nuclear imaging and radiotherapy. Quick progress in nanotechnology opened new possibilities for the design of copper-based drugs and medical materials. Copper toxicity against the virus may be considered as regulations of copper metabolism and copper enzyme system that is needed for certain critical enzymes to function in the body which copper is involved in the functioning of the nervous system, maintaining the balance of other useful metals in the body[30],[31].

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

Copper oxide nanoparticles (CuONPs) are widely used as catalysts and semiconductors that the ability of CuONPs to reduce bacterial population and virus application is enhanced, releasing Cu ions required for optimum killing [32][33]. The CuONPs in doses (<400 ppm) is safe for biomedical application and no side-effects, but its high dose (<400 ppm) is toxic [34]. CuONP inhalation could induce pulmonary fibrosis in C57BL/6 mice that there is an urgent need to prevent the adverse effects of CuONPs in human respiratory system [25].

Nanosized copper(I) iodide particles show inactivation activity against H1N1 influenza[35]. Cu(I) may be useful material for protecting against viral attacks and may be suitable for application such as filters, face masks, protective clothing, and kitchen clothes.

2.3.1 Antiinflammation

According to mythology, wearing copper bracelets and jewelry can ease the pain in rheumatoid arthritis. This belief had drawn attention to possible anti-inflammatory properties of copper ions and complexes. The same was investigated upon by researchers Sorensen, Hostynek et al.[36],[37] their results revealed reaffirmed that metallic copper can indeed penetrate the skin, after being oxidized on air. The anti-inflammatory effect of Cu can be linked with modulation of prostaglandin synthesisHopkins and Failla[38]and Franco and Doria[39].

2.3.2 Copper in nanomedicine

For the past twenty to thirty years, there has been tremendous progress in the field of nanotechnology and nanomedicine. As we know that nanotechnology generally refers to chemistry and physics of 1–100 nm sized particles. Cu²⁺ ions disrupt permeability of the cell's membrane, cause lipid peroxidation and proteins inactivation (Ohsumi et al.[40]; Nan et al.[41]; Raffi et al. [42]; Wu et al.[43]). Antibacterial properties of nanometer-sized copper particles come mainly from ions liberation, however, the size has an important role in adsorption on the bacterial cell surface (Raffi et al.[42]). It is possible to prepare polymers doped with metallic or ionic copper. Such polymers can be used for making dressings, sutures, bandages, and other

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

medical materials with anti-infection, anti-inflammatory and healing-accelerating properties (Zhang et al.[44]); Respiratory face masks with CuO offers a great deal of protection against H1N1 human influenza virus (Borkow et al.[45]).

3. Conclusion

The sudden outbreak of COVID-19 in China and subsequent spread to all over the world have taken the shape of a pandemic. With the virus spreading at a tremendous rate with over 276,000 people infected more than 11,400 people dead as on 21-March-2020. Still, there is no vaccine and an absolute cure for the SARS-CoV-2 virus. Some pharmaceutical companies have come forward with their potential COVID-19 vaccine candidate. But the production and administration of the vaccine to the population all over the world is a time-related process. Few existing repurposed drugs have been evaluated for the treatment of COVID-19 and have shown good results.

In this review paper, three possible techniques have been identified alongwith the currently administered treatment to novel Coronavirus (COVID-19) patients. The resonance frequency therapy is one of the possible candidates, as it has proven its efficacy against targeted destruction of Leukemia cells, Pancreatic cancer cells, Borellia burgdoferi virus, Rubella measles, Satellite Tobacco Necrosis Virus and many more and this treatment alongwith the presently administered treatment to COVID-19 patients might aid in their quick recovery from illness. As treating a huge number of people in hospitals is becoming increasingly difficult and large number of population is under quarantine, a resonance audio frequency of this sort, if placed in public spaces and homes might help a great deal.

The other potential techniques such as beneficial, antimicrobial effects of copper ions and copper oxide nanoparticles have proven their worth in treating HINI virus, HIV, inflammation, arthritis, cancer, and others can be utilized.

The disease curing properties of ethnomedical plants such as Ocimum tenuiflorum L and Black Pepper (Piper nigrum L.), dried Ginger (Zingiber officinale Rosc.), essential oils like Eucalyptus

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

oil proven in human trials to be effective in asthma, acute or chronic bronchitis, COPD, common cold, and sinusitis, could be effective in curing alongwith the presently administered treatment to the COVID-19 patients.

Conflict of interest: none.

Ethical approval: not applicable.

Funding: none.

References

- [1] Coronavirus disease 2019 (COVID-19) Situation Report – 51, World Health Organization.
- [2] M. Cascella, M. Rajnik, A. Cuomo, S.C. Dulebohn, R. Di Napoli, Features , Evaluation and Treatment Coronavirus (COVID-19), (2020) 1–12, Website: <https://www.ncbi.nlm.nih.gov/books/NBK554776/>.
- [3] R. Lu, X. Zhao, J. Li, P. Niu, B. Yang, H. Wu, W. Wang, H. Song, B. Huang, N. Zhu, Y. Bi, X. Ma, F. Zhan, L. Wang, T. Hu, H. Zhou, Z. Hu, W. Zhou, L. Zhao, J. Chen, Y. Meng, J. Wang, Y. Lin, J. Yuan, Z. Xie, J. Ma, W.J. Liu, D. Wang, W. Xu, E.C. Holmes, G.F. Gao, G. Wu, W. Chen, W. Shi, W. Tan, Articles Genomic characterisation and epidemiology of 2019 novel coronavirus: implications for virus origins and receptor binding. *The Lancet*. 395 (2020), 565–574.
- [4] J.F. Chan, K. Kok, Z. Zhu, H. Chu, K. Kai-wang, S. Yuan, K. Yuen, Genomic characterization of the 2019 novel human-pathogenic coronavirus isolated from a patient with atypical pneumonia after visiting Wuhan. *Emerging Microbes & Infections*, 9 (2020), 221-236 .
- [5] C. Liu, Q. Zhou, Y. Li, L.V. Garner, S.P. Watkins, L.J. Carter et al.. Research and Development on Therapeutic Agents and Vaccines for COVID-19 and Related Human Coronavirus Diseases. *ACS Central Science*, 6 (3), 315-331.

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

- [6] D. Wrapp, N. Wang, K.S. Corbett, J.A. Goldsmith, C. Hsieh, O. Abiona, B.S. Graham, J.S. McLellan, Cryo-EM structure of the 2019-nCoV spike in the prefusion conformation. *Science*. 367 (2020) 1260–1263.
- [7] B. Chhikara, B. Rathi, J. Singh, Poonam, Corona virus SARS-CoV-2 disease COVID-19: Infection, prevention and clinical advances of the prospective chemical drug therapeutics. *Chem. Biol. Lett.* 7(1), (2020) 63-72..
- [8] M. Li, R. Jin, Y. Peng, C. Wang, W. Ren, F. Lv, S. Gong et al., Generation of antibodies against COVID-19 virus for development of diagnostic tools. *medRxiv*; <https://doi.org/10.1101/2020.02.20.20025999> (2020) 4–17.
- [9] Mifsud, E. J.; Hayden, F. G.; Hurt, A. C. Antivirals targeting the polymerase complex of influenza viruses. *Antiviral Res.* 2019, 169, 104545.
- [10] D. Guo, Old Weapon for New Enemy: Drug Repurposing for Treatment of Newly Emerging Viral Diseases, *Virologica Sinica*. 12250 (2020).
- [11] E.J. Mifsud, F.G. Hayden, A.C. Hurt, Antivirals targeting the polymerase complex of influenza viruses, *Antiviral Research*. 169 (2019) 104545.
- [12] R. Qiu, Outcome reporting from protocols of clinical trials of Coronavirus Disease 2019 (COVID-19): a review, 2019 (2020).
- [13] T.P. Sheahan, A.C. Sims, S.R. Leist, A. Schäfer, J. Won, A.J. Brown, S.A. Montgomery, A. Hogg, D. Babusis, M.O. Clarke, J.E. Spahn, L. Bauer, S. Sellers, D. Porter, J.Y. Feng, T. Cihlar, R. Jordan, M.R. Denison, R.S. Baric, Comparative therapeutic efficacy of remdesivir and combination lopinavir, ritonavir, and interferon beta against MERS-CoV, *Nature Communications*. (2012). doi:10.1038/s41467-019-13940-6.
- [14] P. Richardson, I. Griffin, C. Tucker, D. Smith, O. Oechsle, A. Phelan, J. Stebbing, Correspondence Baricitinib as potential, *The Lancet*. 6736 (2020) 2019–2020.

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

- [15] N. Chen, M. Zhou, X. Dong, J. Qu, F. Gong, Y. Han, Y. Qiu, J. Wang, Y. Liu, Y. Wei, J. Xia, T. Yu, Articles Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan , China : a descriptive study, *The Lancet*. 6736 (2020) 1–7.
- [16] C. Huang, Y. Wang, X. Li, L. Ren, J. Zhao, Y. Hu, L. Zhang, G. Fan, J. Xu, X. Gu, Clinical features of patients infected with 2019 novel coronavirus in Wuhan , China. *The Lancet*, 395 (2020) 497–506.
- [17] D. Wang, B. Hu, C. Hu, F. Zhu, X. Liu, J. Zhang. Fangfang Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus–Infected Pneumonia in Wuhan, China. *JAMA* 323(11) (2020) 1061–1069. doi:10.1001/jama.2020.1585.
- [18] C. Lai, T. Shih, W. Ko, H. Tang, P. Hsueh, International Journal of Antimicrobial Agents Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): The epidemic and the challenges, *International Journal of Antimicrobial Agents*. 55 (2020) 105924. doi:10.1016/j.ijantimicag.2020.105924.
- [19] E.C. Dykeman, O.F. Sankey, Low Frequency Mechanical Modes of Viral Capsids : An Atomistic Approach, *PhysRevLett*.100.028101 (2008) 1–4.
- [20] C.A. Boehm, Methods For Determining Therapeutic Resonant Frequencies, US Patent 7,280,874 B2, (2007).
- [21] U. Nobbmann, How do I know the minimum concentration needed for measuring the size of my protein?, Website: <https://www.materialstalks.com/blog/2016/01/21/zetasizer-sensitivity-for-protein-dls/>
- [22] G. Dubost, A. Holland, J. Bare, Morphological Transformations Of Human Cancer Cells And Microtubules Caused By Frequency Specific Pulsed Electric Fields Broadcast By An Enclosed Gas Plasma Antenna, *Proceedings - 7th International Workshop on Biological Effects of EMF - October 2012 (Malta)*, ISBN: 978-99957-0-361-5.

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

(2012) 1–9.

- [23] G. Mcvean, P. Awadalla, P. Fearnhead, A Coalescent-Based Method for Detecting and Estimating Recombination From Gene Sequences. Genetics Society of America, 160 (2002) 1231–1241.
- [24] J.E. Bare, Resonant frequency therapy device, US Patent 5,908,441, (2007).
- [25] P. Ordejón, D.A. Drabold, R.M. Martin, M.P. Grumbach, Linear system-size scaling methods for electronic-structure calculations, Physical Review B 51 (1995) 1456–1476.
- [26] D. Banerjee, S. Paul, M. Mandal, Ethnomedicinal Plants Used By Some Of The Tribal Communities Of Panchet Soil Conservation Division , Bankura District , West Bengal , India. Explor Anim Med Res 6(1), 53-62.
- [27] G. Horváth, K. Ács, Essential oils in the treatment of respiratory tract diseases highlighting their role in bacterial infections and their anti-inflammatory action : a review. Flavour Fragr. J. (2015) 331–341.
- [28] P. Taylor, J.R. Hood, J.M. Wilkinson, H.M.A. Cavanagh, J.R. Hood, J.M. Wilkinson, H.M.A. Cavanagh, Evaluation of Common Antibacterial Screening Methods Utilized in Essential Oil Research Evaluation of Common Antibacterial Screening Methods Utilized in Essential Oil Research, J. Essent. Oil Res., 15, (2003) 428-433.
- [29] A. C. Hymes, L. T. Ong, G. R. Persons. United States Patent: Drug Dispensing Device for Transdermal Delivery of Medicaments, US 4,675,009, 23 June 1987.
- [30] U. C. Chaturvedi, R. Shrivastava and R. K. Upreti Viral infections and trace elements: A complex interaction. Current Science, 87 (11), 1536-1554.
- [31] T. Ishida, Antiviral Activities of Cu²⁺ Ions in Viral Prevention , Replication , RNA Degradation , and for Antiviral Efficacies of Lytic Virus , ROS-Mediated Virus , Copper Chelation, World Scientific News, 99 (2018) 148-168.

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

- [32] G. Ren, D. Hu, E.W.C. Cheng, M.A. Vargas-reus, P. Reip, R.P. Allaker, Characterisation of copper oxide nanoparticles for antimicrobial applications, *International Journal of Antimicrobial Agents* 33 (2009) 587–590.
- [33] P. Szyman'ski, T. Fraczek, M. Markowicz, E.M. Olasik, Development of copper based drugs , radiopharmaceuticals and medical materials, *Biometals* (2012) 25:1089–1112.
- [34] A. Mohammadyari, S.T. Razavipour, M. Mohammadbeigi, M. Negahdary, M. Ajdary, Explore in-vivo toxicity assessment of copper oxide nanoparticle in Wistar rats. *J Biol Today's World*, 3 (2014) 124–128.
- [35] Y. Fujimori, T. Sato, T. Hayata, T. Nagao, M. Nakayama, T. Nakayama, R. Sugamata, K. Suzuki, W. Pure, C. Industries, Novel Antiviral Characteristics of Nanosized Copper (I) Iodide Particles Showing Inactivation Activity against 2009 Pandemic H1N1, *Applied and Environmental Microbiology*, (2012) 951–955.
- [36] F. Dreher, H.I. Maibach, Human stratum corneum penetration by copper : In vivo study after occlusive and semi-occlusive application of the metal as powder. *Food and Chemical Toxicology*, 44(9), (2006) 1539–1543.
- [37] J.R.J. Sorenson, D. Ph, 6, Copper Complexes Offer a Physiological Approach to Treatment of Chronic Diseases. *Progress in Medicinal Chemistry*, 26 (1989) 437-568.
- [38] Hopkins, Robin G and Failla, Mark L, Biochemical and Molecular Action of Nutrients- Transcriptional Regulation of Interleukin-2 Gene Expression Is Impaired by Copper Deficiency in Jurkat Human T Lymphocytes. 129 (3) (1999) 596–601.
- [39] L.F. U, D. Doria, I. Farmacologia, P.B. Roma, Prostaglandins And Nitric Oxide In Copper-Complex Mediated Protection Against Ethanol-Induced Gastric Damage. *Pharmacological Research* 36(5) (1997) 395-399.

Please Note: (a) The idea of COVID-19 treatment with resonance frequency therapy was first conceived and shared by me publicly via Facebook post on 14-Feb-2020.

(b) This paper was earlier communicated to International Journal of Antimicrobial Agents on 18-Mar-2020.

(c) This paper was previously submitted to OSF preprints on 10-April-2020.

(d) This paper has also been published in my book titled "Communication between Virus and Virus-infected Cells" LAP publishers on 14-Sep-2020.

- [40] Y. Ohsumi, K. Kitamoto, Y. Anraku, Changes Induced in the Permeability Barrier of the Yeast Plasma Membrane by Cupric Ion, *Journal Of Bacteriology*, 170(6) 1988, 2676-2682.
- [41] L. Nan, W. Yang, Y. Liu, H. Xu, Y. Li, K. Yang, Antibacterial Mechanism of Copper-bearing Antibacterial Stainless Steel against E . Coli. *J. Mater. Sci. Technol.*, 24(2), 2008, 197-201.
- [42] M. Raffi, S. Mehrwan, Investigations into the antibacterial behavior of copper nanoparticles against Escherichia coli, *Annals of Microbiology*, 60 (2010) 75–80.
- [43] Y. Wu, G. Han, Y. Gong, Y. Zhang, Y. Xia, C. Yue, D. Wu, Antibacterial Property and Mechanism of Copper Alginate Fiber, *Advanced Materials Research* 152 (2011), 1351-1355
- [44] W. Zhang, Y. Zhang, J. Ji, Q. Yan, A. Huang, P.K. Chu, Antimicrobial polyethylene with controlled copper release. *Journal of Biomedical Materials Research Part A*, doi: 10.1002/jbm.a.
- [45] G. Borkow, S.S. Zhou, T. Page, J. Gabbay, A Novel Anti-Influenza Copper Oxide Containing Respiratory Face Mask. *PLoS ONE* 5(6) (2010), 1-8.
- [46] P.C.Y. Woo, S.K.P. Lau, C. Chu, K. Chan, H. Tsoi, Y. Huang, B.H.L. Wong, R.W.S. Poon, J.J. Cai, W. Luk, L.L.M. Poon, S.S.Y. Wong, Y. Guan, J.S.M. Peiris, K. Yuen, Characterization and Complete Genome Sequence of a Novel Coronavirus , Coronavirus HKU1 , from Patients with Pneumonia, *Journal of Virology*. 79 (2005) 884–895.